

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
13 January 2005 (13.01.2005)

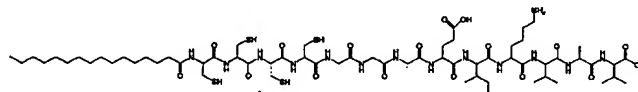
PCT

(10) International Publication Number  
WO 2005/003292 A2

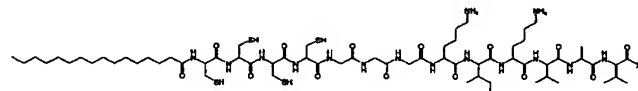
- (51) International Patent Classification<sup>7</sup>: C12N
- (21) International Application Number: PCT/US2003/035902
- (22) International Filing Date:  
12 November 2003 (12.11.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/425,689 12 November 2002 (12.11.2002) US  
60/425,536 12 November 2002 (12.11.2002) US  
PCT/US03/04779  
18 February 2003 (18.02.2003) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE, EG, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— without international search report and to be republished upon receipt of that report

[Continued on next page]

(54) Title: COMPOSITION AND METHOD FOR SELF-ASSEMBLY AND MINERALIZATION OF PEPTIDE AMPHIPHILES



Molecule 1



Molecule 2

(57) Abstract: The present invention is directed to a composition useful for making homogeneously mineralized self assembled peptide-amphiphile nanofibers and nanofiber gels. The composition is generally a solution comprised of a positively or negatively charged peptide-amphiphile and a like signed ion from the mineral. Mixing this solution with a second solution containing a dissolved counter-ion of the mineral and/or a second oppositely charged peptide amphiphile, results in the rapid self assembly of the peptide-amphiphiles into a nanofiber gel and templated mineralization of the ions. Templated mineralization of the initially dissolved mineral cations and anions in the mixture occurs with preferential orientation of the mineral crystals along the fiber surfaces within the nanofiber gel. One advantage of the present invention is that it results in homogenous growth of the mineral throughout the nanofiber gel. Another advantage of the present invention is that the nanofiber gel formation and mineralization reactions occur in a single mixing step and under substantially neutral or physiological pH conditions. These homogeneous nanostructured composite materials are useful for medical applications especially the regeneration of damaged bone in mammals. This invention is directed to the synthesis of peptide-amphiphiles with more than one amphiphilic moment and to supramolecular compositions comprised of such multi-dimensional peptide-amphiphiles. Supramolecular compositions can be formed by self assembly of multi-dimensional peptide-amphiphiles by mixing them with a solution comprising a monovalent cation.

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Rec PCT/PTO 06 MAY 2005

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